How to Interview Persons Involved about Accidents due to Human Errors

Prevention of occurrence or reoccurrence of accidents and transport disruptions requires effective measures based on precise analysis of high-quality information on actual events as they occur. Such information can be obtained by investigators conducting on-site fact-finding and direct interviews with persons involved. Since many events with particularly high risk involve human errors, it is important to collect multifaceted information on the cause and process up to the occurrence by conducting interviews with persons involved. In this article, we will mainly describe how to interview people and points to be kept in mind.

Keywords: Human error theory, Industrial/clinical psychology, 4M4E analysis, Ergonomics

1 Introduction

Currently, our personnel acquire skill in investigating accidents and transport disruptions (“accident investigation”) due to human errors mainly through personal experience and guidance by senior staff. In order to systematize accident investigation skill, the Safety Research Laboratory has identified skills and know-how by means such holding hearings with JR East expert accident investigators and researching other industries. In this article, we will describe the requirements for accident investigators and how to interview persons involved.

2 Purpose of Accident Investigation

The purpose of accident investigation is not to pursue responsibility of persons involved. Rather, its purpose is to accurately identify the accident and determine the inducing factors that we may develop effective measures to prevent reoccurrence.

In light of that, it is important for accident investigators to carry out investigation from various perspectives based on the “three actualities principle” (actual location, actual object, actual people)\(^1\). Such investigation asks investigators to carefully avoid rigid views, while fully using past investigation experiences, to correctly identify the facts.

3 Requirements of Accident Investigators

3.1 Motivation to Determine Causes and Strong Inquisitiveness

Accidents and transport disruptions have causes and results. In the process of investigation, however, investigators often identify only the results, not the cause. This is because it is difficult to collect information and data all at once that clarify the cause-and-effect sequence.

Thus, accident investigators require motivation and inquisitiveness. As precise investigation is the basis of accident prevention, they should do their best to find all the facts about the accident at hand, even in cases when they are facing difficulties of the investigation being at a deadlock.

(Motivation and inquisitiveness)

- Always stick to quality of analysis because incorrect identification and analysis of events leads to meaningless countermeasures.
- Causes that led to accidents should be defined at the time they are discovered, but only after identifying all possible causes and fully exploring and checking the important ones among those.

3.2 Practice of “Three Actualities Principle” and Day-to-Day Information-Gathering

Investigation requires sensitivity to check the scene of the accident, feel the conditions that easily invite errors and find something new. That applies in both data gathering while simulating the accident and in interviewing people involved. Such sensitivity is cultivated in practicing “three actualities principle”.

Furthermore, cooperation with personnel and worksite organizations in different job areas is essential for deepening analysis and developing and tracing countermeasures. Frequent face-to-face communication and information sharing is thus important.

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\(^1\) JR East has set forth the “three actualities principle” as a cornerstone of the “2013 Safety Vision”.

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(Time of interview)
- In liaison with personnel such as field supervisors, coordinate for the earliest possible interviews with people involved, going as far as suspending their jobs depending on the accident.
- Take into account the situations of the people involved when setting the date, time and location. Give priority to the opportunity for interviews, and hold interviews with persons involved before they go home for reasons such as being off duty. Conduct interviews even early in the morning, after shifts or on holidays.

(2) Location and Number of Persons
In order to protect the privacy of the persons involved, hold interviews in a quiet room. Interviews should be held individually, even when two or more persons are involved. In order to prevent unnecessary tension, the number of investigators should be three or four at most.

(Location and number of persons)
- Use a room to which the persons involved are familiar, such as a meeting room that they normally use for purposes such as training.
- In some cases, the presence of their field supervisor acts to move the interview in a good direction because a trusted supervisor being present provides a sense of ease.

(3) Seating
L-shaped seating (Fig. 1) is generally considered more suitable to interviews than face-to-face seating across a desk. The accident investigator should sit in a position allowing observation of the interviewee and have an assistant especially for taking notes.

(Seating)
- People involved who were severely traumatized often feel intimidated when sitting face-to-face with investigators.
- Investigators should put the minimum required materials on the desk because a desk cluttered with documents gives the interviewee an impression of being investigated.

Next, we will cover the method of interviewing persons involved, an important information source to identify causes of errors.

4 How to Interview

4.1 Time of and Preparation for Interview
(1) Time
People tend to forget things as time passes, so it is best to have the first interview as soon as possible. A reason for that is that as time passes, people tend to compensate actual memories with speculation or information from other people and create ‘memories’ in their mind different from what actually happened.

(Three actualities principle)
- The basis of investigating according to the principle is going to the site and seeing for oneself to check the situation. Visit the site in the same conditions as those of the actual accident as much as possible in terms of elements such as time, weather and facilities.
- Before working on or removing objects in the initial investigation, keep a precise record of them with photos, measurements, sketches and descriptions. Reset all parts and components removed to their original state upon making records of those.

(3.3 Accumulation of Knowledge and Analysis Skill)
Accident investigation requires a broad range of knowledge such as that on individual job rules and regulations, investigation results of past similar accidents and human factors.

Furthermore, many skills for accident investigation are acquired through experiences in a trial-and-error method. These include skills such as how to form a perspective for individual accidents, how to collect information in the field and interview people involved and how to analyze collected information.

It is important to value honest questions when in areas one is unfamiliar with, learn investigation skills from experienced investigators and improve oneself. One should master the lessons learned as one’s own skill by applying them in the field.

(Accumulation of knowledge and analysis skill)
- An attitude of acquiring necessary information under one’s own initiative is important. The effort to make others understand the acquired information, making drawings as necessary for example, deepens one’s own understanding.
- Active discussion with other employees broadens and deepens one’s outlook and way of thinking.

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(How to Interview)

Investigator
Interviewee
Assistant

Fig. 1  An Example of Seating

(4) Preparation of Items to Interview on, etc.
Before interviewing, investigators should check preliminary reports and other materials to identify the situation, going as far as visiting the site when time allows. Investigators should also collect as
much data as possible and prepare the items to interview on after organizing and understanding such information. Such data include records about rolling stock and signal facilities, rules related to the job in question and data of past similar events. At this stage, however, investigators must carefully avoid fixing the direction of the interview. In a fixed direction, they could end up terminating the interview with insufficient results, being unconsciously satisfied by interviewing only on the points that the investigator sees as problems.

(Preparation of points items to interview on, etc.)
• When checking the rules and manuals related to the job in question, check more than just general ones. Also check if there are any special rules etc. for the section of the person involved.
• Based on the collected information, make a list of the minimum points that need to be checked. Investigators should assume multiple possibilities rather than just paying attention to the points that seem important to them.
• Check information such as the work environment and possibility of errors by interviewing other persons who do the same job as the person involved.
• When interviewing by more than one investigator, divide the roles in the interview in advance. Designate a main interviewer so as not to interview in disorderly manner.

4.2 To Earn Trust and Gain Honest Comments
Persons involved may have strong feelings of guilt, uncertainty over having caused the accident or disruption. Those persons are thus not in a condition to calmly remember the details of the accident or disruption or may be hesitant to talk about certain things.

Investigators should have the interviewee understand that the interview is to prevent similar errors and such prevention definitely requires the help of the interviewee. In order to have the interviewee feel at ease enough to make honest comments, investigators need to make efforts to build a relationship of trust.

(To earn trust)
• Tell and have the interviewee understand that those involved are not being accused and that the information the interviewee has is valuable to contribute to safety improvement.
• Start the talk with a subject completely unrelated to the accident, creating a relaxed atmosphere. Serve the interviewee something to drink to calm him/her down.
• Introduce an actual case where finding the essential factors inducing the error were found by interview and led to effective measures. This will help the interviewee understand that the information he/she has is a key to safety improvement.
• Have the investigator tell a story of his or her own failure to make the interviewee see that people make mistakes.

4.3 To Collect Accurate Information on Errors
(1) Be Unbiased
Biased interviews and speculation and prejudice narrow the understanding of the details and their meaning, making appropriate information collection and analysis impossible.

Since the persons involved might be inconsistent in their recollections, let the interviewee speak freely, even when investigators find details unreasonable from a professional perspective. Do not deny or terminate the comment of the interviewee midway.

(To be unbiased)
• Do not create a story from reference information such as characteristics of the site, past similar accidents, or statements of other persons. Those should be kept in mind, however.
• Do not assess the details at the early stage of the interview. Place yourself in the position of the persons involved at the time of the occurrence to deepen the understanding of the situation.
• Do not show the interviewee too much data and materials on the situation at the occurrence of the accident. Doing so may make the interviewee might simply answer “if the data says so, it must be right” or stop speaking on the facts as he/she experienced. The basis of the investigation is having interviewee talk.
• Do not make questions that only require a yes or no answer, demonstrating that a prejudged conclusion has already been reached.

(2) Have the Interviewee Remember the Facts
Persons involved repeatedly try to recall in the interview the situation at the time of the occurrence; however, it is impossible to remember all. In some cases where the interviewee is tied to the accident, it could be even more difficult.

When given too many opportunities to recall the situation, people sometimes make up things that they really have no memories of. So, inventive approaches to help them accurately recall the facts using visual aids such as drawings and photos of the related scene may be needed.

(To have the interviewee remember the facts)
• When checking the equipment operation procedures, use enlarged drawings or photos of the equipment and have the interviewees point to things such as the buttons they pressed. This helps them recall the procedure.
• Do not immediately ask why they made an error. Investigators should have the interviewee imagine the situation at ease, using gestures as necessary.
• While the interviewee is trying to remember or speak something, just wait. Do not break in on.
• When the comments of the interviewee come to be inconsistent or the interviewee keeps silent, a break to refresh will be necessary.

(3) Extracting Causes of the Error in a Multifaceted Manner
After identifying elements such as the full picture of the event, individual procedures and the situation at the occurrence of the error, investigators have to extract factors that induced the error in a multifaceted manner by interviewing. Causes of errors, including problems in organization and management, are always complicated and complex. So, it is important to interview broadly on the background factors from a 4M (Man, Machine, Material, Management) perspective.
(To extract causes of the error)
- Be careful not to focus only on major errors or on human causes. It is important not to be hung up on things like discrepancies in job procedures and categorizing the types of errors.
- Remember that human errors do not occur by chance. However, even persons involved are sometimes unaware of the cause, so investigators must not lead the interviewee by stating presumptions.
- Investigate when and what problems occurred in comparison with the proper process. Check the usual behaviors and procedures of the person involved in the same situation as at the scene to verify differences at the time of the error.
- In analyzing, separate thoughts of the person involved from elements such as facts based on testimony regarding the actual behavior of that person.

(At finishing the interview)
- Before finishing, check that the interviewee doesn’t have anything left to say. It is important that the interviewee can be satisfied with the interview.
- Confirm the content of the interview with the interviewee. In confirmation, recheck if there are any skipped points to be heard and if there is anything additional to ask.

4.4 Development of Countermeasures and Motivation
Upon confirmation of the event and its causes, investigators have to develop practical measures against errors that the people involved can instigate. Investigators should consider such development an opportunity to improve together to make out practical approaches that can be continued in on-site work, rather than just gain countermeasures from interviews.
Investigators also have to recognize interviews as a chance for education to improve safety awareness and motivate the people for efforts in safety.

(Development of countermeasures and motivation)
- Investigators should think from the interviewee’s point of view. They should develop actual and practical countermeasures for the field job together.
- Interviewing is also a chance for educating the people involved. Experience of an accident and the efforts taken afterwards provide an opportunity to remind of the importance of safety and aim to be a safety instructor. Motivating to take positive action is necessary.
- Have the interviewee understand the importance of actively telling the lesson he or she learned to prevent recurrence of the same error by colleagues.
- In interviewing, do not focus only on negative aspects. Investigators should congratulate the people involved on their appropriate behavior such as in actions after the event.

(Organizing the interview)
- Clarify the cause-and-effect relation of the obtained information by restructuring the event with illustrations along a timeline. Identify the full picture including the positions of the people involved in the scene by plotting those in a drawing.

4.5 Before Finishing the Interview
When investigators reach the conclusion of the points to be heard, the planned hearing time is over or the interviewee looks tired, that is about the time to finish the interview. Before finishing, investigators must confirm the content of the interview with the interviewee. Finally, investigators should tell the interviewee that the interview was useful and thank him or her.

(Checking the interview)
- Hear from persons who have knowledge and experience at the same level as the interviewee to confirm and compare what judgment and behavior they tend to take in similar situations.
- When carrying out reproduction tests on-site, set the conditions to be the same as those at the accident as much as possible and repeat the tests more than once.
- If discrepancies are discovered when comparing materials, consider whether or not any of the materials include errors or if there is a lack of materials that could make up for the discrepancies.

In future efforts, we will continue and deepen hearings with our expert accident investigators and research in other industries. Through that we will organize and systematize the conditions where we could improve investigation skills in total in addition to improving the interview method and the requirements of accident investigators. We will also study how to educate and foster the skills of accident investigators.